IN THE CLAIMS:

The following listing of claims replaces any prior listing of claims.

1. (Currently Amended) A pressurizer for pressurizing a fluid, comprising:

at least two storage tanks, wherein, for each storage tank, said pressurizer further comprises:

a propellant entrance valve connected to and associated with said storage tank;

a propellant exit valve connected to and associated with said storage tank;

a pressurant entrance valve connected to and associated with said storage tank; and

a pressurant exit valve connected to and associated with said storage tank,

wherein each of said storage tanks is configured to be filled with said fluid under a low pressure when its associated propellant entrance and pressurant exit valves are open and its associated propellant exit and pressurant entrance valves are closed, and to be drained of said fluid under a high pressure by the force of a pressurant when its associated propellant entrance and pressurant exit valves are closed and its associated propellant exit and pressurant entrance valves are open,

~~wherein, for each storage tank, its associated valves are configured to be opened and closed in a cycle to sequentially fill and drain their associated storage tank of said fluid, said cycle having a cycle time,~~

~~wherein said cycles of said associated valves of said storage tanks are out of phase with each other such that at some time in which one storage tank is being filled with said fluid, at least one other storage tank is being drained of said fluid,~~ and

~~wherein said cycle time for each storage tank is between 1 and 500 milliseconds~~

wherein at least one of a) – g) is true:

a) for each storage tank, the associated pressurant exit valve comprises a plurality of separate flow holes and a movable valving member configured to restrict flow through the plurality of separate flow holes simultaneously;

b) for each storage tank, the associated propellant exit valve comprises a plurality of separate flow holes;

c) the associated pressurant exit valve for each storage tank comprises at least one flow hole and a movable valving member configured to restrict flow through the flow hole, wherein a shortest flow distance from the movable valving member to a meniscus of the fluid inside the storage tank when the storage tank is fully filled with the fluid is substantially less than a shortest flow distance from the movable valving member to a meniscus of the fluid inside the storage tank when the storage tank is fully drained of the fluid;

d) the associated pressurant exit valve for each storage tank comprises at least one flow hole and a movable valving member configured to restrict flow through the flow hole, wherein each storage tank comprises a movable partition configured to substantially separate the fluid from the pressurant during filling and draining, wherein a shortest flow distance from the movable valving member to a surface of the movable partition when the storage tank is fully filled with the fluid is less than approximately one-tenth a shortest flow distance from the movable valving member to the movable partition when the storage tank is fully drained of the fluid;

e) the associated pressurant exit valve for each storage tank comprises at least one flow hole and a movable valving member configured to restrict flow through the flow hole, wherein each storage tank comprises a movable partition configured to substantially separate the fluid from the pressurant during filling and draining, wherein a square root of a total flow cross sectional area of the associated pressurant exit valve is greater than ten

times a shortest flow distance from the movable valving member to a surface of the movable partition when the storage tank is fully filled with the fluid;

f) the associated pressurant exit valve for each storage tank comprises at least one flow hole and a movable valving member configured to restrict flow through the flow hole, wherein each storage tank comprises a movable partition configured to substantially separate the fluid from the pressurant during filling and draining, wherein a square root of a total flow cross sectional area of the associated pressurant exit valve is greater than a shortest flow distance from the movable valving member to a surface of the movable partition when the storage tank is fully filled with the fluid; and

g) the pressurizer further comprises a movable partition inside each storage tank, configured to substantially separate the fluid from the pressurant, wherein the movable partition of a first storage tank is connected to the movable partition of a second storage tank, so that a pumping cycle of the first storage tank and a pumping cycle of the second storage tank are offset by half a pumping cycle.

2. – 16. (Canceled)

17. (Currently Amended) An impulse reaction engine system, comprising:

an impulse reaction engine;

~~a propellant tank configured to contain propellant at a low pressure;~~

~~a gas generator configured to generate pressurant at a high pressure from liquid propellants;~~ and

the pressurizer as claimed in claim 1 connected to the impulse reaction engine~~, the pressurizer configured to transfer propellant from said propellant tank at said low pressure to said impulse reaction engine at [[said]] a high pressure in a substantially continuous flow,~~

~~wherein at least one of a) and b) is true:~~

~~a) said associated pressurant exit valve for each storage tank comprises at least one flow hole and a movable valving member configured to restrict flow through said flow hole, wherein each storage tank comprises a movable partition configured to substantially separate said propellant from said pressurant during filling and draining, wherein a shortest flow distance from said movable valving member to a surface of said movable partition when said storage tank is fully filled with said propellant is substantially less than a shortest flow distance from said movable valving member to said movable partition when said storage tank is fully drained of said propellant; and~~

~~b) said associated pressurant exit valve for each storage tank has a total flow cross sectional area that is at least one tenth of a maximum cross sectional area of said storage tank in a direction perpendicular to a flow direction of said propellant inside said storage tank~~.

18. - 20. (Canceled)

21. (Currently Amended) A pressurizer for pressurizing a fluid, comprising:
a storage tank;
an accumulator;
a propellant entrance valve connected to said storage tank;
a propellant exit valve connected between said storage tank and said accumulator;
a pressurant entrance valve connected to said storage tank; and
a pressurant exit valve connected to said storage tank,

wherein said storage tank is configured to be filled with said fluid under a low pressure when said propellant entrance and pressurant exit valves are open and said propellant exit and pressurant entrance valves are closed, and to be drained of said fluid under a high pressure by the force of a pressurant when said propellant entrance and pressurant exit valves are closed and said propellant exit and pressurant entrance valves are open,

~~wherein said valves are configured to be opened and closed in a cycle to sequentially fill and drain said storage tank of said fluid, said cycle having a cycle time,~~

wherein said accumulator is configured to provide a substantially continuous flow of said fluid at said high pressure by filling with said fluid when said storage tank is draining of said fluid, and by draining of said fluid when said storage tank is filling with said fluid,

~~wherein said cycle time is between 1 and 500 milliseconds,~~ and

wherein at least one of a) and b) is true:

a) said pressurant exit valve comprises at least one flow hole and a movable valving member configured to restrict flow through said flow hole, wherein said storage tank comprises a movable partition configured to substantially separate said fluid from said pressurant during filling and draining, wherein a shortest flow distance from said movable valving member to a surface of said movable partition when said storage tank is fully filled with said fluid is substantially less than a shortest flow distance from said movable valving member to said movable partition when said storage tank is fully drained of said fluid; and

b) said pressurant exit valve has a total flow cross sectional area that is at least one-tenth of a maximum cross sectional area of said storage tank in a direction perpendicular to a flow direction of said fluid inside said storage tank.

22. - 24. (Canceled)

25. (Currently Amended) A pressurizer for pressurizing a fluid, comprising:
at least one pressure vessel;
a piston movable in said at least one pressure vessel;

at least two pressurant entrance valves configured to be opened and closed ~~in a cycle and~~ out of phase with each other;

at least two pressurant exit valves configured to be opened and closed ~~in said cycle and~~ out of phase with each other;

at least two propellant entrance valves configured to be opened and closed ~~in said cycle and~~ out of phase with each other; and

at least two propellant exit valves configured to be opened and closed ~~in said cycle and~~ out of phase with each other,

wherein at least the at least two pressurant entrance valves and the at least two pressurant exit valves are connected to said at least one pressure vessel,

wherein said pressurizer is configured to be filled with said fluid under a low pressure and to be drained of said fluid under a high pressure by the force of a pressurant,

~~wherein the at least two pressurant entrance valves, the at least two pressurant exit valves, the at least two propellant entrance valves, and the at least two propellant exit valves are configured to be opened and closed in said cycle to sequentially fill and drain said pressurizer of said fluid, said cycle having a cycle time,~~

wherein the pressurizer is configured to be filled with said fluid and drained of said fluid substantially simultaneously so as to deliver a substantially continuous flow of said fluid,

wherein the piston comprises at least two piston portions connected by a connecting rod,

wherein at least one of the at least two piston portions is reciprocatingly movable along a substantially linear segment,

wherein at least one of the pressurant exit valves comprises at least one flow hole and a movable valving member configured to restrict flow through the flow hole, and

~~wherein said cycle time is between 1 and 250 milliseconds~~

wherein at least one of a) and b) is true:

a) a shortest flow distance from said movable valving member to a surface of said at least one of said piston portions when located at one end of said linear segment is less than approximately one-tenth a shortest flow distance from said movable valving member to said at least one of said piston portions when located at an opposite end of said linear segment; and

b) a square root of a total flow cross sectional area of said at least one of said pressurant exit valves is substantially greater than a shortest flow distance from said movable valving member to a surface of said at least one of said piston portions when located at a proximal end of said linear segment.

26. (Canceled)

27. (Currently Amended) ~~A rocket~~ An impulse reaction engine system, comprising:

an impulse reaction engine; and

the pressurizer as claimed in claim [[26]] 25 connected to said impulse reaction engine~~,~~

~~wherein the piston comprises a differential piston, and~~

~~wherein the pressurant is generated at least in part by heat from the impulse reaction engine~~.

28. – 32. (Canceled)

33. (Currently Amended) ~~A rocket~~ The impulse reaction engine system as in claim 27, ~~comprising:~~

~~an impulse reaction engine; and~~

~~the pressurizer as claimed in claim 32 connected to said impulse reaction engine,~~

wherein the piston comprises a differential piston, and

wherein the pressurant is generated at least in part by the impulse reaction engine~~, and~~

~~wherein at least one of said pressurant exit valves has a total flow cross sectional area that is at least one tenth of a maximum cross sectional area of said at least one pressure vessel in a direction perpendicular to a flow direction of said fluid inside said at least one pressure vessel~~.

34. – 45. (Canceled)

46. (Previously Presented) The pressurizer as in claim 21, wherein b) is true.

47. (Currently Amended) [[The]] A method of pumping a fluid, comprising:

providing the pressurizer as claimed in claim 21; and ~~, wherein said~~

opening and closing the valves in cycles to sequentially fill and drain the storage tank of the fluid, the cycles each having a cycle time [[is]] between approximately 1 and [[100]] 500 milliseconds.

48. (New) The pressurizer as in claim 21, wherein a) is true.

49. (New) The pressurizer as in claim 1, wherein at least two of a) – g) are true.

50. (New) The pressurizer as in claim 1, wherein at least four of a) – g) are true.

51. (New) The pressurizer as in claim 1, wherein a) is true.

52. (New) The pressurizer as in claim 1, wherein b) is true.

53. (New) The pressurizer as in claim 1, wherein c) is true.

54. (New) The pressurizer as in claim 1, wherein d) is true.

55. (New) The pressurizer as in claim 1, wherein e) is true.

56. (New) The pressurizer as in claim 1, wherein f) is true.

57. (New) The pressurizer as in claim 1, wherein g) is true.

58. (New) A method of pumping a fluid, comprising:

providing the pressurizer as claimed in claim 1; and

for each storage tank, opening and closing its associated valves in cycles to sequentially fill and drain the storage tank of the fluid, the cycles each having a cycle time between approximately 1 and 500 milliseconds,

wherein the cycles of the associated valves of the storage tanks are out of phase with each other such that at some time in which one storage tank is being filled with the fluid, at least one other storage tank is being drained of the fluid.

59. (New) The impulse reaction engine system as in claim 17, wherein at least one of h) and i) is true:

h) said associated pressurant exit valve for each storage tank comprises at least one flow hole and a movable valving member configured to restrict flow through said flow hole, wherein each storage tank comprises a movable partition configured to substantially separate said propellant from said pressurant during filling and draining, wherein a

shortest flow distance from said movable valving member to a surface of said movable partition when said storage tank is fully filled with said propellant is substantially less than a shortest flow distance from said movable valving member to said movable partition when said storage tank is fully drained of said propellant; and

i) said associated pressurant exit valve for each storage tank has a total flow cross sectional area that is at least one-tenth of a maximum cross sectional area of said storage tank in a direction perpendicular to a flow direction of said propellant inside said storage tank.

60. (New) The impulse reaction engine system as in claim 17, wherein at least three of a) – g) are true.

61. (New) The impulse reaction engine system as in claim 17, further comprising:

a propellant tank configured to contain propellant at a low pressure; and

a gas generator configured to generate pressurant at a high pressure from liquid propellants,

wherein the pressurizer is configured to transfer propellant from the propellant tank at the low pressure to the impulse reaction engine at the high pressure in a substantially continuous flow.

62. (New) A method of pumping a fluid, comprising:

providing the pressurizer as claimed in claim 25; and

opening and closing the at least two pressurant entrance valves, the at least two pressurant exit valves, the at least two propellant entrance valves, and the at least two propellant exit valves in cycles to sequentially fill and drain the pressurizer of the fluid, the cycles each having a cycle time between approximately 1 and 500 milliseconds.

63. (New) The pressurizer as in claim 25, wherein a) is true.

64. (New) The pressurizer as in claim 25, wherein b) is true.

65. (New) An impulse reaction engine system, comprising:

an impulse reaction engine;

a propellant tank configured to contain propellant at a low pressure; and

a pressurizer configured to transfer propellant from the propellant tank at the low pressure to the impulse reaction engine at a high pressure in a substantially continuous flow,

wherein at least one of a) and b) is true:

a) the pressurizer comprises:

at least two storage tanks, wherein, for each storage tank, the pressurizer further comprises:

a propellant entrance valve connected to and associated with the storage tank;

a propellant exit valve connected to and associated with the storage tank;

a pressurant entrance valve connected to and associated with the storage tank; and

a pressurant exit valve connected to and associated with the storage tank,

wherein each of the storage tanks is configured to be filled with the propellant under a low pressure when its associated propellant entrance and pressurant exit valves are open and its associated propellant exit and pressurant entrance valves are closed, and to be drained of the propellant under a high pressure by the force of a pressurant when its associated propellant entrance and pressurant exit valves are closed and its associated propellant exit and pressurant entrance valves are open; and

b) the pressurizer comprises:

at least one pressure vessel;

a piston movable in the at least one pressure vessel;

at least two pressurant entrance valves configured to be opened and closed out of phase with each other;

at least two pressurant exit valves configured to be opened and closed out of phase with each other;

at least two propellant entrance valves configured to be opened and closed out of phase with each other; and

at least two propellant exit valves configured to be opened and closed out of phase with each other,

wherein at least the at least two pressurant entrance valves and the at least two pressurant exit valves are connected to the at least one pressure vessel,

wherein the pressurizer is configured to be filled with the propellant under a low pressure and to be drained of the propellant under a high pressure by the force of a pressurant, and

wherein the pressurizer is configured to be filled with the propellant and drained of the propellant substantially simultaneously so as to deliver a substantially continuous flow of the propellant.

66. (New) A method of operating an impulse reaction engine system, comprising:

providing the impulse reaction engine system as claimed in claim 65;

if a) is true, then, for each storage tank, opening and closing its associated valves in cycles to sequentially fill and drain the storage tank of the propellant, the cycles each having a cycle time between approximately 1 and 500 milliseconds; and

if b) is true, opening and closing the at least two pressurant entrance valves, the at least two pressurant exit valves, the at least two propellant entrance valves, and the at least two propellant exit valves in cycles to sequentially fill and drain the pressurizer of the propellant, the cycles each having a cycle time between approximately 1 and 500 milliseconds.